Docket No.: 1422-0678PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Mikio SAKAGUCHI et al.

Application No.: 10/537,833 Confirmation No.: 8685

Filed: June 8, 2005 Art Unit: 1793

For: SPHERICAL CASTING SAND Examiner: K. P. Kerns

DECLARATION UNDER 37 C.F.R. § 1.132

MS Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Mikio SAKAGUCHI, declare the following:

I have read and understand the specification and claims to the above-identified application and the outstanding Office Action of March 18, 2008 (hereinafter "Office Action").

I have also read and considered the references cited therein as the basis of the anticipation/obviousness rejection under 35 U.S.C. § 102(b)/103(a) by JP 08-090150 (hereinafter "JP '150") and the obviousness rejection under 35 U.S.C. § 103(a) by Anzai *et al.*, U. S. Patent No. 4,923,520 (hereinafter "Anzai").

A person skilled in the art would not have been able to produce a spherical molding sand of the present invention with the particles of JP '150 having particle sizes of 500 μm or more with the granulation calcination method from the disclosure of JP '150.

A person skilled in the art would not have been able to produce a spherical molding sand of the present invention based on the combination of JP '150 and Anzai, since JP '150 requires particle sizes of 500 μm or more and Anzai requires particle sizes of 50 μm or less.

In support of the above statements, below is a description of the individual molding sands that were presented to the Examiner in an exhibit during an Examiner Interview on June 24, 2008. More specifically, below are detailed explanations of each particle presented to the Examiner in the interview of June 24, 2008, along with physical characteristics of each compiled in tabular format.

Example Prepared by the Flame Fusion Method

This Example corresponds to Example 3 presented within the specification at page 16 line 14 and is discussed in detail below.

A mullite powder (synthetic mullite powder manufactured by Shibata Ceramics Co., Ltd.) containing 97% by weight of Al_2O_3 and SiO_2 in a total amount and having an Al_2O_3/SiO_2 weight ratio of 2.7, a water content of 0.1% by weight, an average particle size of 0.25 mm, and a major axis diameter/minor axis diameter ratio of 1.3 was used as a starting material.

This powder was supplied by using oxygen as a carrier gas to flame (about 2000°C) which was generated by combustion of LPG (propane gas) in a ratio of LPG/oxygen of 1.1 (volume ratio), to give a monodispersed spherical molding sand.

The resulting molding sand contained 98% by weight of Al_2O_3 and SiO_2 in a total amount and had an Al_2O_3/SiO_2 weight ratio of 2.7, an average particle size of 0.21 mm, a spherical degree of 0.99, water absorption of 0% by weight, and a particle density of 3.1 g/cm^3. The enclosed photograph of this molding sand example is depicted on the left hand side of the

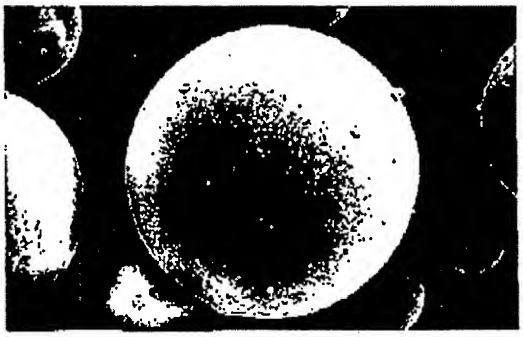
enclosed figure. It can be seen from the left hand side photograph that every molding sand particle is spherical.

Comparative Example Prepared by the Granulation Calcination Method

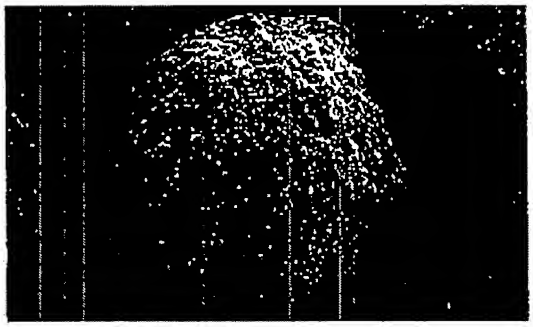
This Comparative Example corresponds to Comparative Example 1 presented within the specification at page 19 line 19 and is discussed in detail below.

Powdery particles (containing 96% by weight of Al_2O_3 and SiO_2 in a total amount), which were prepared by mixing aluminum hydroxide with kaolin so as to have an Al_2O_3/SiO_2 weight ratio of 2.7 and subjecting the mixture to a treatment using a spray-dryer to form spherical particles, were calcined in an electric furnace at 1500°C for 1 hour, to give a spherical molding sand. The resulting molding sand contained 97% by weight of Al_2O_3 and SiO_2 in a total amount and had an Al_2O_3/SiO_2 weight ratio of 2.7, an average particle size of 0.18 mm, a spherical degree of 0.89, water absorption of 1.2% by weight, and a particle density of 2.7 g/cm^3. A photograph of this molding sand is shown on the right hand side of the figure below. It can be seen from the right hand photograph within the figure below these molding sand particles have a low spherical degree and are pitted.

Flame Fusion Method Example



Granulation Calcination Method Example



	Flame Fusion Method Example	Granulation Calcination Method Example
Total Al_2O_3 and SiO_2 (wt. %)	98%	97%
Al_2O_3/SiO_2 weight ratio	2.7	2.7
Average particle size (mm)	0.21	0.18
Spherical degree	0.99	0.89
Water absorption (wt. %)	0%	1.2%
Particle density of (g/cm^3)	3.1	2.7

With regards JP '150 and Anzai the following facts are asserted.

Anzai uses spherical fused silica of 50 μm or greater (*see* Anzai column 3 lines 60 - 68) and Anzai mentions that "proportions of particles that are not fully fused, e.g., which do not become non-crystalline throughout, or which are not fully spherical in shape, increase when fused silica having an average particle diameter above 50 μm is to be produced." (Emphasis added)

JP '150 discusses that the particle size required is from 500 μm to 1500 μm (*see* Abstract). Since Anzai uses particle sizes less than 50 μm and indicates that a particle size of 50 μm or greater produces particles not spherical in shape, and since the particle sizes of JP '150 are

greater than 500 μm, one skilled in the art would not be motivated to combine JP '150 and Anzai to make or use the spherical molding sand of the present invention.

Therefore, the present application is patentably distinguished from the disclosures of each of JP '150 and Anzai.

STATEMENT UNDER 18 U.S.C. § 1001

I hereby declare that all statements made herein of any own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001, of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: 18 July 2008

Mikio SAKAGUCHI